

Blind Fasteners

by Anthony Di Maio

The term "Blind" is given to fasteners that are installed in work pieces using only one side of the work piece. Fasteners, such as Solid rivets (Fig.1), Tubular and Semi-Tubular rivets need access to both sides of the work piece in order to set these rivets.

On one side these rivets are held against the work piece, while on the back side pressure is applied to the shank of the rivet, expanding the body of the rivet to clamp the work pieces together. When using these types of rivets, both sides of the work pieces must be accessible because pressure must be applied to both sides of the work pieces in order to set the rivet. Therefore, the work pieces must be taken to a rivet setting machine to set these rivets. Solid, Tubular and Semi-Tubular rivets cannot be called "Blind Rivets" because these rivets cannot be set using only one side of the work pieces.

Blind Rivet

Blind Rivets can be called "Blind" Fasteners (Fig.2), because you can rivet components together by using only one side of the work piece (Fig.3).

The Blind Rivet is a two-component fastener, one component is the rivet body and the other is the mandrel. The blind rivet body has the appearance of a solid rivet with the exception that there is a hole completely through the center.

The mandrel has a head and a break point on the shank of the mandrel just below the head. The break point is the weakest point on the shank of the mandrel and it is at this break point that the mandrel will break when the blind rivet is set (Fig.4).

The mandrel head will expand the blind rivet body when the mandrel is pulled. The mandrel head acts as the anvil similar to when setting a solid rivet in a work piece. The mandrel head will continue to travel into the rivet body and expand the blind rivet body. The mandrel will continue to be pulled until the expanding rivet

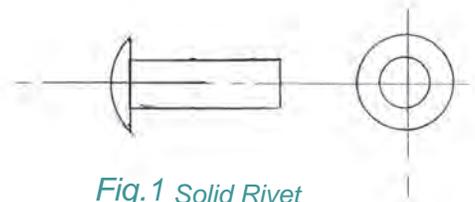


Fig. 1 Solid Rivet

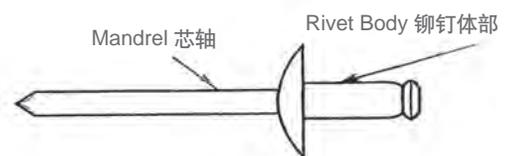


Fig. 2 Blind Rivet



Fig. 3 A Tool Setting a Blind Rivet

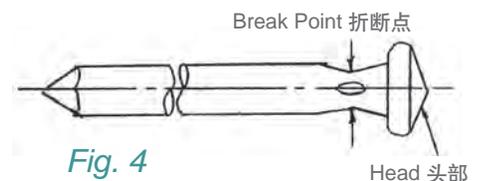


Fig. 4

Head 头部

盲孔铆接类 紧固件

「盲孔铆接」一词是指紧固件安装于工件里，只用到工件的一边。紧固件如实心铆钉(图一)、管状与半管状铆钉，都需要能接近其工件的两边才能安装。

这些铆钉是从一边紧抵著工件，从另外一边施予压力于铆钉的杆部，以扩张铆钉的体部来将工件锁紧在一起。当使用这类型的铆钉时，工件的两边必须可以接近，因为压力必须施予工件的两边才能安装该铆钉。因此，必须将工件放到铆钉安装机以安装这些铆钉。实心、管状与半管状铆钉不能称为「盲孔铆钉」，就是因为这些铆钉不能只从工件的一边来安装的缘故。

● 盲孔铆钉

「盲孔铆钉」可称之为「盲孔铆接」紧固件(图二)，这是因为你可以只利用工件的一边将组件铆接起来(图三)。盲孔铆钉是有两个组件的紧固件，一个是铆钉的体部，另一个是芯轴(拉杆)。盲孔铆钉的体部形状与实心铆钉相同，除了它有一个孔贯穿其中心部分。

芯轴有一个头部，头部底下为芯轴的胫部，胫部上有一折断点。该折断点是芯轴胫部最弱之处，当该铆钉被安装时，芯轴会在折断点断裂(图四)。当芯轴被拉时，芯轴头部会扩张铆钉的体部，这芯轴头部就像安装实心铆钉于工件里时的铁钻。该芯轴头部会进入铆钉的体部，使铆钉体部膨胀，芯轴继续被拉著，直到膨胀的体部接触到工件。此时芯轴头部会施加压力(锁紧负荷)于要被铆接的工件上。这铆钉安装工具会继续拉住该芯轴，直到达到折断点的抗拉强度，而后芯轴在该折断点断裂。至此，工件已经藉著它的一边而被铆接住了。

body contact the work piece. The mandrel head will now apply pressure (clamp load) to the work piece being riveted. The blind rivet setting tool will continue to pull the mandrel until the tensile strength of the break point is reached and then the mandrel will break at this break point. Now, the work pieces are riveted together by using only one side of the work piece.

This ability to rivet together work pieces by only using one side of the work piece, has given the fabrication of parts an easy and less expensive operation. Example: Blind riveting a component to either a long section of round or square sheet metal (air ducts) where you cannot reach the area you are riveting inside the air duct, this area is the blind side of the assembly. But a blind rivet can work very well in this type of application, because the blind rivet can be set from one side of the assembly. The blind rivet setting tool can be taken to the riveting station, rather than moving the work piece to a solid rivet setting machine. The ability to use a blind rivet setting tool at the production area has decreased the cost of riveting components together.

Threaded Insert

The Threaded Insert (**Fig.5**) is also a blind fastener because it also can be set using only one side of the work piece.

The Threaded Insert is applied to one or more thin material components. When set in a work piece, it gives the user a female thread and is set tight enough to not rotate when a bolt is assembled to the set threaded insert (**Fig.6**).

The threaded insert eliminates the need to pierce and dimple thin material and then thread tap the dimple to produce a threaded hole. Using a threaded insert you need only to punch or drill the recommended hole diameter, thread the threaded insert to a setting tool, insert the threaded insert into the punched or drilled hole and set the insert. Then, unscrew the setting tool from the set threaded insert and you now have a secure threaded hole to fabricate components to.

Threaded inserts come in many different designs, round shanks, hex shanks, round ribbed shanks, flat heads and thin heads. They are produced in steel, aluminum and stainless steel in a wide range of work thicknesses and thread sizes.

I apply Sealant to the shank side of the head that makes the threaded insert watertight. I also apply a one thread Nylon patch to the lead thread of the insert that prevents the bolt from loosening during vibration (**Fig.7**).

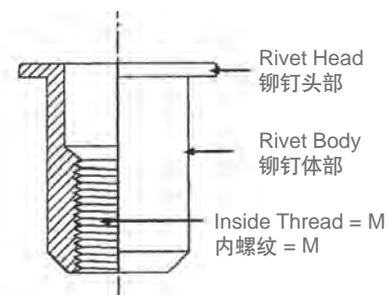


Fig. 5 Threaded Insert

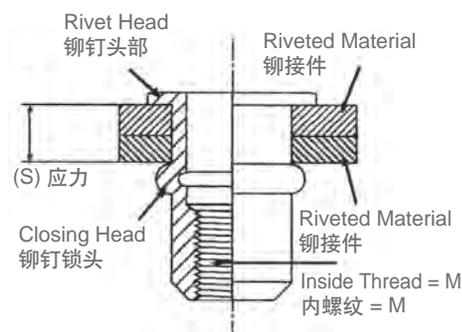


Fig. 6 Grip Range of the Blind Rivet Nut (Insert)

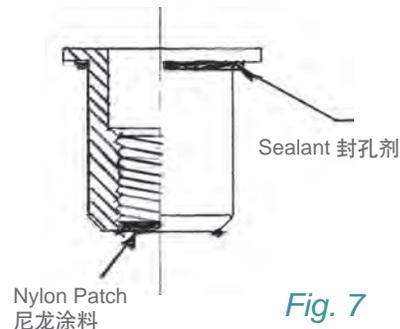


Fig. 7

此种只利用工件的一边来铆接工件的能力，使得零件的制造变成容易又不昂贵的作业。例如：当你要铆接一个组件於一圆形或方形的纵切面金属片上，你无法接触到要铆接的区域，因为它在空气孔道里面，是该组合件的盲端处。可是盲孔铆钉在此种场合则可以应用得宜，因为盲孔铆钉可以从组合件的单边安装。盲孔铆钉可以直接用安装工具铆接，而不需要将工件送到实心铆钉的安装机器上安装。此种可在生产区使用盲孔铆钉安装工具的能力，降低了铆合组件的成本。

● 螺纹护套

螺纹护套(图五)也是一种盲孔紧固件，因为它也可以只利用工件的一边来安装。螺纹护套用於一个或多个薄材料的组件。当它安装於工件内後，就给了使用者一个内螺纹。在螺栓组装入该护套时，该螺纹护套会被锁紧，不会随著旋转(图六)。

螺纹护套可免除在薄材料上穿孔戳洞，再改制螺纹，变成一个有螺纹的孔。使用螺纹护套，你只需钻个所需直径的孔，将此螺纹护套旋入安装工具，再将此护套嵌入所钻的孔而固定该护套即可。此时，将安装工具逆向旋离该安装定位的轮纹护套，你就有一个牢固的螺纹孔可以制造组合件。

螺纹护套有许多不同的设计，有圆脛、六角脛、圆形且有环节的脛、扁头形与薄头形，它们有钢制、铝制与不锈钢制的，工件厚度与螺纹尺寸范围也很广。笔者会在紧固件头部下之脛部涂上封孔剂，使该螺纹护套不透水，笔者也会在螺纹护套的导程螺纹涂上一条螺纹量的尼龙涂层，以防止螺栓在震动中松脱(图七)。